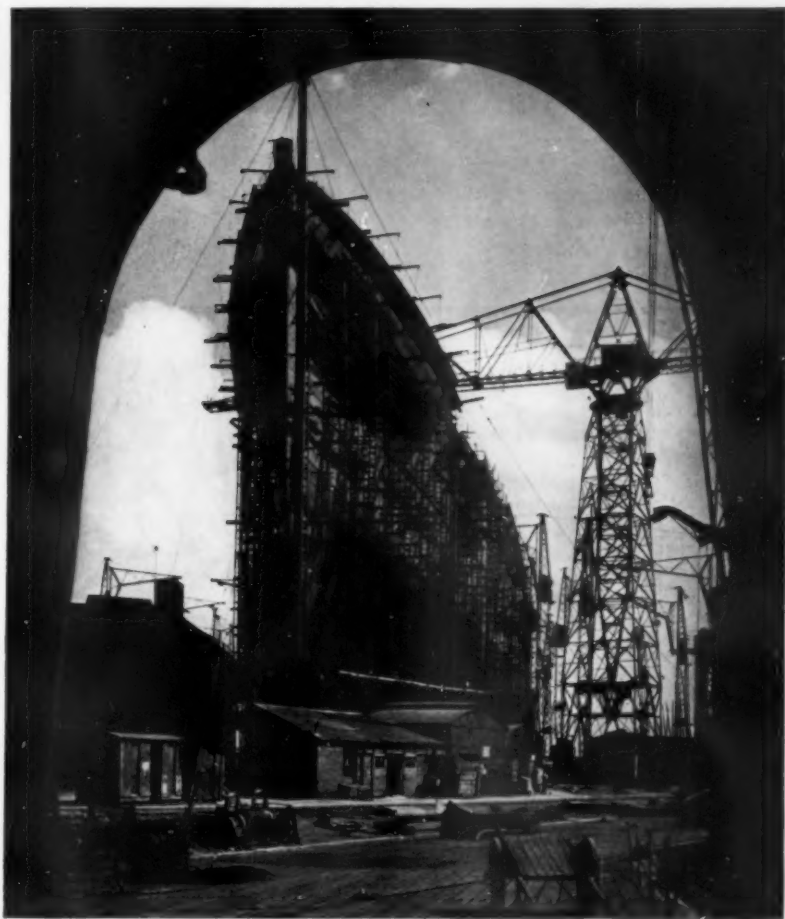


PRICE
15¢

Dec 29

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



SEPTEMBER 22, 1934

"Number 534"

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SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVI

No. 702

The Weekly  Current
Summary of Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian and Foreign subscribers please add \$1 a year to regular subscription rates to cover postage.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

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Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserv, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

Panama is appropriately named from an Indian word meaning "abounding in fish."

Where water used in dishwashing is hard, it can be effectively softened with sodium metaphosphate.

The Bureau of Mines has developed an improved apparatus and method for determining the helium content in natural gas.

A western arbutus that grows to tree size is sometimes so completely attacked by a leaf-killing fungus that it is completely defoliated.

California's most important lumber tree, the ponderosa pine, is endangered by a disease called twig blight now active in the Southwest.

The Metropolitan Museum of Art in New York has planted an herb garden at its Gothic branch, to resemble gardens in medieval monasteries.

There probably are fewer than 100 trumpeter swans left in the United States.

British records of drought go back to the year 298 A.D., when there was a drought in Wales.

An appeal has been launched in England for preservation of the historical antiquities on the Island of Cyprus, now in a state of neglect.

Goajira Indians of Colombia manufacture poison for arrows by mixing a pulp of spiders, centipedes, scorpions, and the venom of snakes.

Excavations in the ancient market place of Athens have yielded no less than 31,600 coins dating from sixth century B.C. to modern times.

Among the medical exhibits at the Chicago Fair is the medicine kit carried by Stanley when he hunted for Livingstone in Africa in 1887.

WITH THE SCIENCES THIS WEEK

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ANIMAL PSYCHOLOGY

Are male monkeys masterful? p. 184.

ARCHAEOLOGY

What is the mystery of the Sacred Well? p. 182. *The History of the Maya*—Thomas Gann and J. Eric Thompson—Scribner's, 1931, \$2.50.

ASTRONOMY

How does alcohol aid in keeping the stars in order? p. 185.

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Should tonsils always be removed when they are enlarged? p. 184.

What causes the retina of the eye to become detached? p. 182.

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What effect has the enzyme arginase? p. 181.

What vitamin is valuable in treating pyorrhea? p. 179. *The Vitamins*—H. C. Sherman and S. L. Smith—Chem. Cat. Co., second ed., 1931, \$6.

METALLURGY

How does nature do copper plating? p. 184.

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What starts the procession of hurricanes in the fall? p. 183. *Why the Weather?*—Charles F. Brooks—Harcourt, Brace, 1924, \$2.

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Do infants find it easy to learn to tricycle? p. 180.

Is the chimpanzee's "thinking" of the random trial-and-error variety? p. 184.

What profession is held in highest esteem? p. 185.

Why is an electric current direct to the brain painless? p. 190.

Why should the young child's diet contain plenty of meat? p. 185.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

MEDICINE

Synthetic Vitamin Produces Striking Unexpected Cures

Pyorrhea and Bleeding Disorders Respond Remarkably To Ascorbic Acid Which Is Concentrated Vitamin C

SYNTHETIC vitamin C, called ascorbic acid, in its first actual use on medical patients is producing very striking and unexpected disease conquests, the British Association for the Advancement of Science was informed by Prof. A. Szent-Györgyi, the Hungarian chemist who played a major role in the artificial manufacture of this important vitamin.

The mouth disorder known as pyorrhea, a certain kind of hemophilia which is a disease of bleeding, certain forms of hemorrhagic nephritis, and several other diseases against which medicine was helpless are seemingly being cured by ascorbic acid. Ascorbic acid is not a cure for hereditary hemophilia.

"This is the more striking since these pathological conditions have not been thought to be connected with lack of vitamin," Prof. Szent-Györgyi explained. "These curative effects suggest that humanity is suffering much more gravely from a lack of vitamin C than has hitherto been supposed."

Disfiguring colorations of the skin brought on by illness are also made to disappear by ascorbic acid. Patients with Addison's disease, who have a yellow color, can be bleached out again by the use of this substance.

Fast-Moving Drama

The complete exploration of the mysterious vitamin C, found most abundantly in citrus fruit, was one of the most fast-moving dramas in current science. In the short space of two years vitamin C has been identified, its chemical structure determined and it has been made synthetically in the laboratory. The pure, highly concentrated vitamin C acid has been made available for industry and medicine.

Hungary, represented by Prof. Szent-Györgyi, who is director of Szeged University's Institute of Medical Chemistry, Switzerland, England and other countries have worked together through their scientists in this great chemical conquest.

"It is pleasant to note that this unparalleled advance is due entirely to the closest and friendliest international collaboration," Prof. Szent-Györgyi said as he spoke before British scientists.

It is predicted that the role of ascorbic acid in life may be even more important than is now realized, for there seems to be no cell life in higher organisms without ascorbic acid.

Salvation of Teeth

Vitamin D, the sunshine vitamin present in liver oil and green vegetables, was called the salvation of teeth by Dr. May Mellanby, British Medical Research Council investigator. It helps to prevent and arrest dental decay or caries even in imperfect teeth. Beautiful teeth are found in Eskimos who get their vitamin D from blubber and in natives of the tropics who get theirs through exposure of naked bodies to the ultraviolet rays of the sun.

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ENTOMOLOGY

Long-Lost Caterpillar Of Rare Butterfly Re-Found

IT WAS only a green caterpillar about an inch long.

But it had been lost since 1790, about the time when George Washington refused to run for a third term; so naturalists have felt a bit piqued about the matter. Such elusiveness on the part of any insect species is a challenge—the more so since the adult butterflies into which these caterpillars turn have been seen occasionally in damp, dusky woodlands in the South. It is known as the gold-banded skipper.

Now Austin H. Clark, Smithsonian Institution zoologist, has managed to obtain a collection of these caterpillars. He did it by reversing the process by which the original discoverer of the species, one John Abbot, a Georgia school-teacher, in 1790 got his first gold-banded skipper butterfly. John Abbot captured one caterpillar, and

kept it until it had spun its cocoon, to emerge later as the full-winged butterfly. Austin Clark obtained 160 eggs, and kept them until a part of the lot produced the long-lost caterpillars.

Mr. Clark's caterpillars fit the description of the old-time Georgia schoolteacher's one specimen: apple-green body, rose-pink neck, claret-brown head with two large staring yellow eye-spots. It has a curious habit of cutting a wedge-shaped flap out of the edge of a leaf and folding it into a little peaked tent sewn together with silk. In this it hides during the day, clinging to the under side of the roof; at night it emerges to feed.

Science News Letter, September 22, 1934

GEODESY

Is America Getting A Broader Waistline?

IS AMERICA getting wider across the middle?

Or has some slight error crept into either the measuring methods of the astronomers or their arithmetic?

Whatever may be the case, the distance between Washington, D. C., and San Diego, Calif., showed an apparent increase of about forty feet in 1933 as compared with measurements made seven years earlier. This discrepancy was reported at the meeting of the American Astronomical Society at Connecticut College, New London, by C. B. Watts of the U. S. Naval Observatory.

Mr. Watts added, however, that he inclined to the second alternative; it appears easier for astronomers to make an error of forty feet in measuring a line 3,000 miles long than for the United States to grow forty feet "fatter" in seven years.

Science News Letter, September 22, 1934



GOLD-BANDED SKIPPER

The caterpillar of this butterfly has until now eluded searching scientists although the butterfly itself has been repeatedly seen.

PSYCHOLOGY

Jimmy and Johnny Are Both Trained Now

Baby Who Became Athlete Before He Was Two Years Old Is Now Receiving Competition From Twin Brother

JOHNNY, the famous twin baby who has been trained by a psychologist from the time he was 20 days old until he was 22 months, no longer so greatly outshines his untrained twin in athletic prowess, Dr. Myrtle B. McGraw, his instructor, told psychologists attending the meeting of the American Psychological Association.

For Jimmy, the other twin, who has lived the normal life of the ordinary protected baby, has now been given his turn at special training. Some things he picked up in short order. One of these was tricycling, which Johnny had had considerable difficulty with some months earlier. Jimmy's greater maturity was apparently of great value to him in mastering this art of pushing one foot after the other, which is something of a stumbling block to younger gentlemen.

For other activities, such as skating, his advanced age did not help a bit. In these matters he made no more improvement during his two months and a half of training than his twin Johnny did in the same length of time at a much earlier age.

Jimmy was hampered in learning some of the stunts by his uncooperative attitude, and in these he showed rapid improvement as soon as he was taught to be more acquiescent, Dr. McGraw reported. However, during his training period of 2½ months it was not possible to emancipate him entirely of the reticence acquired during the earlier months.

Effect on Attitudes

The attitudes of the two children have been more strikingly different right along as a result of the experiment than have their abilities. Johnny seemed to develop from his training and consequent achievement an attitude of confidence and cooperation. He was always ready and willing to "try anything once." Jimmy, on the contrary, was hesitant and diffident about trusting himself in new attempts.

Whether these attitudes will persist

as the boys have more similar experiences and are no longer subjected to systematic training schedules only time will reveal.

"An individual's life is not made or marred by his experiences during the first two years." This is one of Dr. McGraw's conclusions which should be of comfort to concerned parents. "Barren environment during the subsequent years may more than offset the good beginning in the same way that a drought may completely ruin a fine start toward the production of perfect corn."

Training at the Right Time

There are critical periods when certain types of skills or knowledge can best be learned, she found. This conclusion is pointed to by Jimmy's ease in learning what Johnny had found difficult at an earlier age. One chief rea-

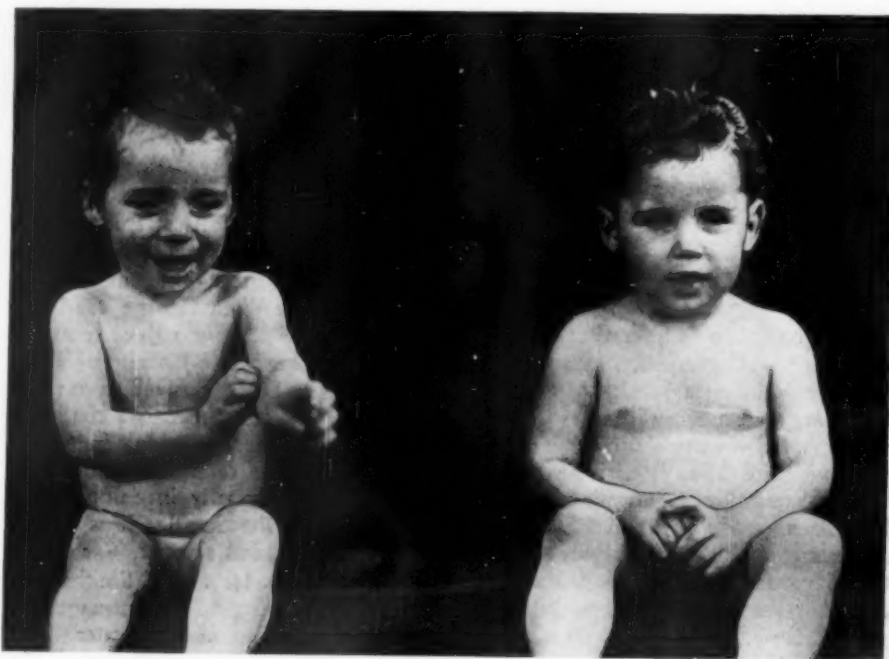
son for Johnny's rapid learning was the fact that his instructor seized on the "psychological moment" for his training.

As soon as he was seen to push furniture about the room, Dr. McGraw would devise situations providing incentives for his developing this ability, as well as discrimination in different sizes of the stools and boxes. She used a series of stools and boxes graded in size. A toy or cookie would be placed just out of Johnny's reach and he was urged to get it by pushing together two or more stools or boxes in order to climb up on them and thus compensate for his short stature. Soon he was pushing them about and climbing on them at a great rate.

Interests the Cue

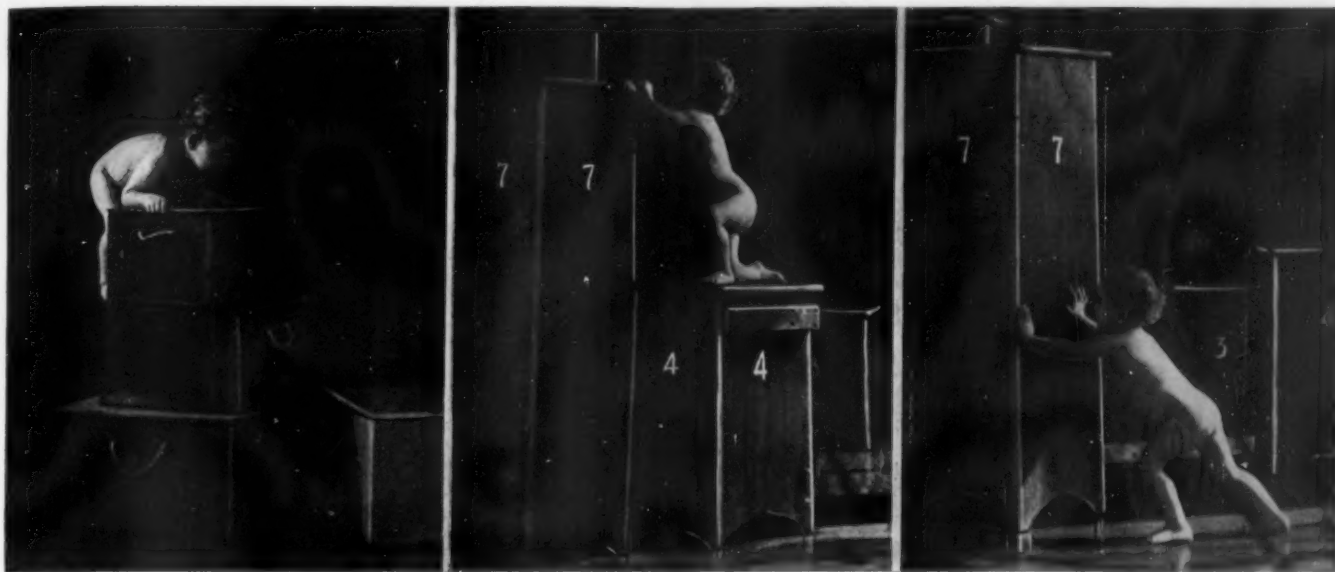
As soon as he revealed a budding interest in games of hide and seek, a course of memory training was started for him. He was encouraged to hide objects, and then after he had played about for a while with other things, was sent to find the hidden toy. Gradually the task of remembering where he had put it was made more difficult by increasing the number of diverting activities intervening between the hiding and the seeking.

Dr. McGraw objects to the term



JIMMY AND JOHNNY GROW OLDER

Can you tell which is the trained twin of this famous pair who have made psychological history? They are now big boys, two and a half years old. It was Johnny (right) whose intensive training under the direction of a psychologist began at the early age of 20 days. This photograph and those on the opposite page are the work of Lena Towsley, New York photographer of children.



JOHNNY GETS WHAT HE WANTS

Since the time he was only 20 days old, this twin boy, Johnny Woods, has been trained to use his muscles and to go after what he wants. His brother was not trained until he was 22 months old. When these pictures were snapped, Johnny was after a banana tied to the ceiling light high over his small head. The stunt of combining the boxes and climbing up as shown in the picture at the left, and of pushing the stools about until it is possible to climb from one to another until the top of the highest is attained is an ability which is greatly increased by training at the proper time.

"conditioning" as applied to the training method she used with these babies.

"Of course the term conditioning has acquired such a loose usage that it has come to mean almost anything, but the method of training employed in this experiment in no way resembled the conditioning technique made famous by

Pavlov in his experiments with dogs or that used by Watson and Jones in their experiments with infants," she explained. "Instead we attempted to stimulate the infant to exercise repeatedly those abilities of which he at the time showed some capability."

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MEDICINE

Enzymes May Help the Body In Battle Against Cancer

A SUGGESTION that the changing enzyme content of various organs of the body during the development of a cancer tumor may represent defensive mechanisms of the body to prevent further malignant growth was advanced before the American Chemical Society by Dr. E. F. Schroeder and Dr. Ellice McDonald of Pennsylvania University's cancer research laboratories.

Future treatment of cancer may be directed toward methods of artificially stimulating the enzyme activity of an organ to aid this apparently natural defensive mechanism of the body, it appears from Dr. McDonald's discussion.

Speaking before the symposium on the chemistry of enzymes, the Pennsylvania scientists traced their recent work

on analyzing the enzyme content of cancer tumors and such organs of the body as the kidneys and liver.

Enzymes are the biological chemical catalysts which make possible chemical reactions without entering into the reactions themselves.

The enzyme arginase, declared the scientists, occurs in large amounts in cancer tissue and appears to be closely associated with rapid growth processes like those found in necrotic tumors. Other rapidly-growing tissues, like those of an embryo, also contain arginase, and as growth slows down the arginase content decreases.

In studies on rats given cancer by implantation it was found that the faster a tumor grows, the more necrotic or

degenerated it becomes and the higher mounts its arginase content.

At the same time the arginase normally present in the liver decreases as the tumor grows.

For two other enzymes, cathepsin and phosphatase, the action works in a reverse sense. Their content in a tumor diminishes as the cancerous growth becomes more necrotic.

The work suggests two pictures of enzyme cancer mechanism, Dr. McDonald declared in concluding.

"The interesting question is raised as to whether these enzyme changes may not be related to a specific immunological reaction against the growth of cancer. For example, the high kidney phosphatase of resistant rats might act as a defensive mechanism against further growth of the tumor.

"Or from another point of view, the implanted cancer tissue might liberate into the blood stream certain enzyme activators, or stimuli, which would cause other organs to respond by setting up a defensive mechanism in the form of increased enzyme activity. If the stimulus is sufficient the animal may throw off the cancer; if not, the cancer grows. This opens an interesting field in the possibility of artificially stimulating enzyme activity of an organ as a defense against further growth of the cancer."

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MEDICINE

Detached Retina Blindness Curable in Half of Cases

Loosened Sight-Tissue "Spot-Welded" Back Into Place With Electric Needles Probing Through the Eyeball

BLINDNESS caused by loosening of the retina, the actual seeing part of the eye, can be cured or at least benefited by operation in nearly 50 per cent. of all cases. So Drs. J. H. Dunnington and J. P. Macnie of New York City reported before the meeting of the American Academy of Ophthalmology and Otolaryngology. The New York surgeons described their results in operations on a series of 150 patients.

The retina, the light-sensitive lining of the eye, is an exceedingly thin, delicate film of living tissue. It may be compared to the photographic film or plate in a camera. It rests on a tissue called the choroid, which contains many blood vessels. From this the retina gets its blood supply.

Sometimes the retina becomes detached from the choroid, peeling off as wallpaper does from a wall. When this happens, the retina fails to get enough nourishment and cannot function properly. The patient feels as if a curtain were falling over part of his eyes and he has increased difficulty in seeing. The retina may not become wholly detached, but if not treated it will as a rule eventually all peel off.

Common Among Boxers

The exact cause of detached retina is not known. It may result from an injury; among boxers it is a common accident. Drs. Dunnington and Macnie reported that nearly a third of their patients were suffering from the condition following injuries.

The most common contributing cause was nearsightedness, which was present in two-thirds of the patients.

Modern treatment of detached retina is based on a method first proposed by a Swiss surgeon, Dr. Gonin. It is analogous to spot welding, the idea being to seal the retina back onto the choroid by cauterization, which produces an adhesive inflammation between them.

One modern method of doing this is by driving many tiny platinum-iridium needles into the choroid. These needles carry an electric current of from 30 to

50 milliamperes, which does the cauterizing. In early cases this method gives as high as 70 to 80 per cent. of cures.

If the retina has been detached from the choroid too long, however, it loses its power to function, and the patient cannot see even after the retina has been re-attached. Consequently the greatest percentage of cures are among early cases.

The operation for treating detached retina is now being performed in all the major clinics in this country.

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ARCHAEOLOGY

Mayan Heirlooms Sacrificed For Rain

ABOUT thirty years ago a dredge was lowered into the Mayan Well of Sacrifice at Chichen Itza, Yucatan, and a quantity of extraordinary objects of gold, jade, and other substances was brought up. The articles, many of them beautiful, showed the sort of things that Mayan Indians brought from their homes and temples to offer to the rain god, long ago. It was their way of warding off, or battling, drought. They were invoking the god to send rain to the growing corn. Bones of young girls, who had been hurled into the well to become brides of the god, also came up in the maw of the dredge.

Since then the mystery of the Sacred Well, suddenly lightened by these discoveries, has clouded again. That is to say, the objects salvaged from its depths became involved in a new atmosphere of mystery. Some, at least, found their way to the United States to a scientific collection. But scientists are still waiting to see the first official report describing the sacrificial contents of the well.

Now and again, flashes of information appear, suggesting the remarkable points of interest which this collection contains.

That the sacrifices poured into the Sacred Well were foreign objects, brought hundreds of miles to northern

Yucatan, is told by Prof. Alfred M. Tozzer of Harvard University in the new scientific publication, *Maya Research*.

There was foreign trade on both sea and land in the Mayan country, Prof. Tozzer states. On his fourth voyage, Columbus met a trading canoe eight feet wide. Citing the contents of the Well of Sacrifice as evidence of long distance trade in early America, Prof. Tozzer says the greatest number of the articles were "more Mexican in feeling" than Mayan.

Ideas of time as well as of space are suggested by the objects. Some of the carvings of jade are like relics from the old Mayan Empire of southern Yucatan.

"Not only did they have to travel hundreds of miles to reach Yucatan," it is explained, "but they were hundreds of years old at the time they were offered as sacrifices. From generation to generation these jades undoubtedly were handed down as heirlooms."

It is easier in a year of drought, like this, to understand the intense feeling of the Mayan Indians when they offered to the god of rain the loveliest of the maidens and the family heirlooms as well.

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CHEMISTRY

Next-to-Heaviest Element, Protactinium, Is Isolated

ISOLATION of the heavy element protactinium* has been achieved, Dr. Aristid Von Grosse, Assistant Professor of Chemistry, University of Chicago, told the American Chemical Society.

Protactinium is the first chemical element to be isolated in the United States, although several elements have been claimed to be discovered here, Dr. Von Grosse declared.

The newly isolated protactinium is next to the heaviest element known, which is uranium with atomic number 92. Protactinium is number 91 and its atoms weigh 231 times as much as those of ordinary hydrogen. It is radioactive and continually breaks down like uranium and radium.

Protactinium's half period, or the length of time in which it disintegrates to half the original amount, is 32,000 years. Radium is much shorter lived, having a half period of 1,600 years, declared Dr. Von Grosse.

*The name of element 91 is variously spelled protactinium or protoactinium (British), and occasionally proactinium.

Of importance to scientists everywhere is the possibility that the famous super-heavy element number 93 of Professor Enrico Fermi, may be an isotope of protactinium. Personally, Dr. Von Grosse said, he believes this to be the case.

The work of isolating protactinium was begun three years ago, when three tons of radium residues were imported from the world's oldest radium factory at Joachimstal, Czechoslovakia. From a ton of these residues and at a cost of \$5,000, Dr. Von Grosse obtained one-tenth gram of pure protactinium

while working with M. S. Agruss.

A tiny sample of the rare substance was exhibited to chemists in Cleveland, Ohio. It is a thin coating of protactinium on tungsten wire and sealed in a glass bulb. A magnifying glass is needed to see it.

Dr. Von Grosse is but 29 years old, born in Riga, Russia, reared in Shanghai, where his father was Russian Consul, and educated in Berlin at the Institute of Technology, where he won the degree of Doctor of Chemical Engineering in 1927.

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METEOROLOGY

Autumn Hurricanes Fewer After High Summer Barometer

HURRICANES, that in autumn months come swooping out of the Caribbean to devastate coastal towns of the Southeast and Gulf States and harry the shipping off the Carolina capes, will be fewer in number this season. At least, this prophecy will hold good if the correlation between summer barometric pressures and autumnal tropical storms over the Antilles worked out statistically by Clifton L. Ray of the San Juan, P. R., office of the U. S. Weather Bureau remains as valid as it has in the past.

Mr. Ray's studies have been based on summer barometric pressures over Puerto Rico and the incidence of storms over the "too-oft-hurricane" isle. But he adds, "The results, while referring only to the Eastern Caribbean, are generally applicable to the entire area, including the Gulf and Central American waters."

The "North Atlantic high" is a familiar fixture on summer meteorological maps. Each year, as the sun reaches its farthest north, a large, stubbornly stationary area of high pressure develops, centering in the general region of the Azores islands. It hangs over the ocean until at least the end of July, and its autumnal break-up is usually the signal for the procession of tropical storms, frequently of hurricane intensity, to begin marching in through the Caribbean and thence either over the Gulf or up the South Atlantic coast of the United States.

Mr. Ray has found that when the summer pressures due to this "high"

are persistently above normal, there is 73 per cent. probability that autumnal tropical storms will be fewer than normal. Conversely, when the summer pressures are lower than normal, more than the usual number of tropical disturbances can be expected to follow.

Calling attention to the fact that during the present year the oceanic "high" has had pressures decidedly in the upper brackets ever since April, Mr. Ray suggests that it will be of interest to observe the outcome of the present season. Thus far there has been only one tropical storm in the Eastern Caribbean area.

Mr. Ray will discuss his results in a communication to be published in a forthcoming issue of the *American Meteorological Bulletin*.

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ASTRONOMY

Flight of Solar Bomb Shown in Motion Pictures

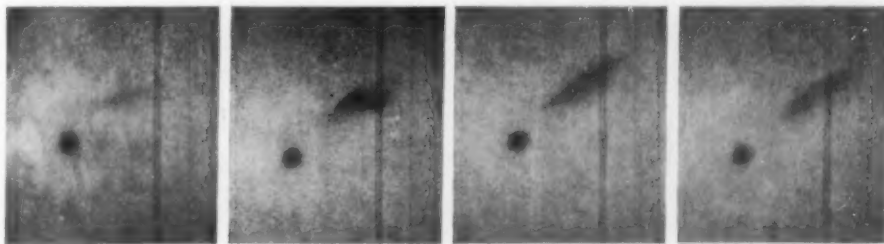
MOTION pictures of a huge "bomb" about 25,000 miles long that shot out from a sunspot on June 19 and then exploded above the solar surface were shown to members of the American Astronomical Society meeting at Connecticut College. The films were made by Robert R. McMath and R. M. Petrie, at the McMath-Hulbert Observatory of the University of Michigan. This is an observatory established by a group of devoted, though non-professional, astronomers especially for taking astronomical motion pictures.

The pictures displayed were the first results shown of the work of the "spectroheliocinematograph," an attachment for the telescope which permits motion pictures to be made of the sun in the light of a single wavelength. The light of glowing hydrogen is normally used, so that the films show the distribution of that element in the sun's atmosphere.

When projected at the usual rate the motion is speeded up about 450 times. Thus changes that would have taken many hours to observe while watching the sun are shown in a few minutes.

According to Mr. Petrie, the sunspot had been under observation for several hours, when a long, dark, wedge-shaped cloud suddenly formed, projecting outwards. It swept out at a calculated speed of about 25 miles a second, and after about 12 minutes it disappeared, leaving near it a dark stream, perhaps some of the same material, which was sucked into the spot at a speed which increased to about 200 miles a second.

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A SOLAR BOMB

Recorded by the light of hydrogen on motion picture film, this emission of a "solar bomb" from a sunspot was made available for the leisurely study of astronomers by scientists at the McMath-Hulbert Observatory of the University of Michigan. The frame at the left shows the sunspots at 2:27:30 p. m., Eastern Standard Time, just before the appearance of the bomb. The next, taken 4 minutes, 10 seconds later, shows the dark mass just after its ejection. The next, taken 2 minutes, 5 seconds after the second, shows the bomb moving away from the spot and becoming indistinct. Finally, the last frame, taken 2 minutes, 30 seconds after the third, shows what may be the same mass of gas re-entering the spot.

METALLURGY

Nature Gives Copper Coats To Ancient Silver Coins

AUTHENTIC Greek and Roman coins of Cyprus, seemingly of copper, have been turning up in excavations, whereas on archaeological grounds these coins would have been expected to have been silver.

Archaeologists turned to metallurgists in this dilemma. Dr. Stanley G. Willimott, government analyst at Cyprus, presented the solution to the Institute of Metals, in England. Nature had taken a hand in what seemed to be archaeological faking and had copper-coated silver coins. Dr. Willimott found that the copper coats were put on by the galvanic action due to the chance contact of silver coins with iron, in the presence of water containing copper sulphate as an electrolyte.

Just to prove that this is possible, he demonstrated this chemical action in the laboratory and coated modern silver coins with a tenacious film of copper.

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MARINE ENGINEERING

Cunard Ocean Giant Ready To Take To The Water

See Front Cover

SEPTEMBER 26 marks the day when King George and Queen Mary of England journey to the shipbuilding town of Clydesbank, Scotland, to launch the new Cunard super-liner—the "534." Unofficially the Princess Elizabeth has been suggested as the name for the new giant of the seas but the ultimate name of the ship is carefully shrouded in mystery.

With a length of 1,018 feet and with a 115-foot beam, the "534" is a hundred feet longer and ten feet wider than any ship now afloat. British marine engineers will be disappointed if the "534" does not reach its estimated speed of from 32 to 35 knots an hour. Its gross tonnage is 73,000 tons.

Comparison with vessels now in use discloses the size-superiority of the still-unnamed "534."

Majestic (British)—56,621 registered tons (R.T.); 915 ft. 5 in. length; 100 ft. 1 in. breadth; 58 ft. 2 in. depth.

Berengaria (British)—52,226 R. T.; 883 ft. 6 in. length; 98 ft. 3 in. breadth; 57 ft. 1 in. depth.

Bremen (German)—51,656 R. T.;

898 ft. 7 in. length; 101 ft. 9 in. breadth; 48 ft. 2 in. depth.

Rex (Italian)—51,062 R. T.; 879 ft. 9 in. length; 97 ft. breadth; 30 ft. 7 in. depth.

Leviathan (U. S.)—48,943 R. T.; 907 ft. 6 in. length; 100 ft. 3 in. breadth; 58 ft. 2 in. depth.

Science News Letter, September 22, 1934

PSYCHOLOGY

Chimpanzee Uses System In Solving Problems

IN TRYING to solve a problem, such as discovering in which of a group of boxes lies the coveted banana, the chimpanzee goes to work in a systematic manner. He doesn't make his attempts in any random, haphazard manner. This evidence of the ape's cleverness has been discovered by Kenneth W. Spence, of Yale University's Experiment Station at Orange Park, Fla.

The attempts of the chimpanzee appear to follow a definite pattern, Mr. Spence declared. For example, if the animal first chooses the first box at the left end of the row, but finds it empty, it will next try the second from the left, and then the third from the left, and so on until the correct box is found. Marked individual differences were found in the speed with which they shift from one incorrect choice to another, and in the tendency to repeat an incorrect choice.

Science News Letter, September 22, 1934

METEOROLOGY

Weather For Autoists At Filling Stations

SPECIAL radio receivers at filling stations and other points along motor routes to supply autoists with weather information is a suggestion by the Bureau of Air Commerce.

Every hour 68 airways broadcast stations in the United States send out the latest weather news for the benefit of fliers. This information, often valuable for motorists, could be made available by the installation of 200 to 400 kilocycle receivers at places motorists frequent on a cross-country trip.

The plan, it is believed, would be particularly valuable in rugged and mountainous regions where a fog may mean delay, a heavy rain a washout and snow an impassable section of road.

Science News Letter, September 22, 1934

IN SCIENCE

MEDICINE

Head Colds Not Benefitted By Removal of the Tonsils

CHILDREN subject to tonsillitis, enlarged glands of the neck and ear trouble are most benefitted by removal of the tonsils, Dr. Albert D. Kaiser of the University of Rochester School of Medicine found from a study of a large group of children for a period of ten years, which he reported to the American Academy of Ophthalmology and Otolaryngology. Heads colds and infections of the chest, on the other hand, were not benefitted by removal of the tonsils. Tonsils may be large without causing any trouble and mere size is no reason for removing them.

Science News Letter, September 22, 1934

ANIMAL PSYCHOLOGY

Masterful Sex Not Always Male in Monkey Societies

AMONG monkeys, it is not always the male who can be described as the masterful or dominant one of a pair, A. H. Maslow, of the University of Wisconsin psychological laboratories, told members of the American Psychological Association.

In an experiment designed to show the relationships between dominance and other social behavior in primates, 15 pairs of previously unacquainted monkeys were tested for 30 periods of 20 minutes each. A limited amount of food was given to each pair to quarrel over.

The question of which would get the better of it was apparently settled by the personality of the animals rather than by the sex. The dominant animal gets more food, plays the masculine role in sex activity regardless of gender, initiates bullying, fighting and play, and is more active, Mr. Maslow reported. The submissive animal gets little or no food, plays the feminine role regardless of gender, and responds to the dominant animal's aggression by passivity, cringing, or flight.

Science News Letter, September 22, 1934

SCIENCE FIELDS

MEDICINE

Sleeping Sickness Injures Intelligence

SLEEPING sickness has an adverse after-effect on intelligence. This is indicated by a study of 83 children who have had the disease, reported by Dr. Andrew W. Brown of the Institute for Juvenile Research, Chicago.

These children were each given at least two ratings on the standard Stanford-Binet test, and some were given three, four, or even five such ratings at intervals of from one to ten years.

The so-called Parkinsonian cases, which are characterized by a remarkable absence of facial expression and rigidity of the muscles, were studied separately. A definite downward trend in intelligence quotient was observed in most of the Parkinsonian cases, and a slight tendency toward deterioration was found in the non-Parkinsonian cases. A marked difference was found between the motor ability of normal children and the victims of sleeping sickness.

Science News Letter, September 22, 1934

PSYCHOLOGY

Lack of Meat In Diet May Cause Stammering

IMPROPER diet in infancy and childhood may be a predisposing factor in causing stammering. Dr. Knight Dunlap, of the Department of Psychology, The Johns Hopkins University, has concluded from a study of the childhood history of a number of stammerers who have come to him for treatment. Lack of sufficient meat is probably the predisposing cause of this speech defect in a great many cases, Dr. Dunlap says in a report of his findings, published in *Science*.

Those who have the opportunity to work with stammering children are urged to try putting them on a diet including plenty of meat.

"From the age of two years, there is no reason why children should not have meat at least twice a day," Dr. Dunlap said. "In many cases where the diet has

previously been badly managed, the problem may be to induce the child to eat a sufficient quantity. Variety of meats and of preparation, with good psychological technique, offer the solution to this problem. Overcooked meats should probably be avoided."

Whether a full meat diet would aid the adult stammerer is conjectural, Dr. Dunlap said.

"The situation of the adult stammerer is of course quite different from that of the stammering child or adolescent," he said. "That which may be a predisposing cause in infancy may have other bearings in adult life. Since a surprisingly large number of adult stammerers are relative vegetarians, however, it would seem possible that meat diet would be advantageous to many of these cases."

Science News Letter, September 22, 1934

ASTRONOMY

Alcohol, Confusing to Man, Helps Keep Stars in Order

ALCOHOL, which sometimes makes men uncertain of their own location, is used by astronomers to gain greater certainty regarding the location of the stars. How this is done was told before the meeting of the American Astronomical Society at Connecticut College, by Dr. Piet van de Kamp, of the McCormick Observatory, University of Virginia, and Dr. A. N. Vyssotsky.

Positions of stars are determined by micrometric measurements of their images on photographic plates. Sometimes the gelatin emulsion on such a plate will warp or stretch or become otherwise distorted when it is wet during the developing process. Star images thus carried only a fraction of a hair's breadth out of their true position may give rise to most impressive inaccuracies, when the little error on the plate is multiplied by the tremendous numbers that are astronomers' playthings.

The alcohol insurance of accuracy used by the two McCormick Observatory astronomers is quite simple in principle. Before a plate is used, it is first soaked in water, then in alcohol, and finally carefully dried. If there is any tendency toward distortion on the part of the emulsion, it gets it all out of its system before it is exposed in the telescopic camera. The star images thereafter "stay put," and the astronomers can depend on the accuracy of their measurements.

Science News Letter, September 22, 1934

PHYSICS

World's Hottest Spot Is in Carbon Arc Light

THE "hot spot" of the world, so far as science can create it, is the carbon electric arc. Such arc lights, used in powerful searchlights, have a temperature of 3,810 degrees above absolute zero. This temperature is exceeded only in distant stars and in the center of the earth.

Scientists have just determined definitely the temperature of carbon arcs, after intensive research which began in 1801 with the work of Sir Humphrey Davy. To have fixed the temperature as 3,810 degrees is an important landmark for science.

In a report to the American Chemical Society in Cleveland, Ohio, Dr. V. C. Hamister, N. K. Chaney and S. W. Glass of the National Carbon Company indicated that the new-found temperature will be as important to the science of high temperatures as is the melting point of ice or the boiling point of water to investigators in ordinary temperature work.

Science News Letter, September 22, 1934

PSYCHOLOGY

Physicians Rated Higher Than U. S. Senators

THE PROFESSION of the physician leads in prestige, no matter what the occupation of the person making the judgment, Dr. George W. Hartmann, of Pennsylvania State College, told members of the American Psychological Association at its recent New York meeting.

The status assigned to any particular career is just about the same when rated by persons engaged in it and when rated by disinterested outsiders, Dr. Hartmann found in personal interviews with 450 persons of various walks of life. The professions stand near the top in prestige, and the "labor" group near the bottom. Here is a sample of how some occupations are rated, from highest to lowest:

Physician first, then United States Senator, professor, lawyer, civil engineer, dentist, clergyman, high-school teacher, factory manager, merchant, salesman, nurse, actor, mail carrier, garage mechanic, tailor, bricklayer, baker, policeman, plumber, miner, barber, cook, and fisherman.

Science News Letter, September 22, 1934

NATURE STUDY

You May Make Animal Friends

**It is Not Necessary to Be Either Saint or Hero
To Tame Shy Creatures of the Wild; Just Stand Quiet**

By DR. FRANK THONE

HIAWATHA, so Longfellow tells us, made friends with the animals and birds of his forest home. He talked to them, and they to him, and thus he learned much of the lore that made him a hero while he lived and a looming myth after he died. St. Francis of Assisi, less mythical but even more legendary, preached to the birds and the fishes—even converted a man-eating wolf and made a vegetarian town-dog of him. It is all told in the "Fioretti," the "little flowers" of tradition that began to cluster around the gentle little poor man while he yet lived, and grew thick over his tomb after he died.

Tales of familiarity and friendship between men and animals are common in old-time rememberings of the race. Elijah had his ravens, St. Jerome his friendly lion. The fierce unicorn would become meek and tame at the bidding of an innocent maiden. No time or people is without such wonder-stories.

They seem wonder-stories to us, not merely because of the possible inaccuracies or exaggerations that may have crept into them through many unwritten tellings, but because there actually seems to be something "unnatural" about familiarity between a human being and a wild animal. It seems normal that birds and rabbits and squirrels should be afraid of us, and hastily get out of the way when they see or hear us coming.

Fear Can Be Avoided

But a fear-relationship between the animal world and ourselves need not be the case. Indeed, it never is the case, except through our own carelessness or cruelty. We need not walk alone in the world as much as we commonly do, and we do not need to be an Indian hero or an Italian saint to win the pleasant companionship of Brother Bluejay or Brother Squirrel. All we need to do is treat them as they are ready to treat us. All we need to do is stand quietly, move slowly, make no needless loud noises. Above all (and

this is hardest of all for our acquisitive human natures) we must not grab!

We cherish the illusion always that to hold is to have. Get your fingers closed round a thing, our instinct tells us, and it is yours. We cannot help that. The most completely restlessly, insatiably prehensile thing in the whole realm of living creatures is the human hand. To a large degree, evolutionists tell us, man was made by his own hands. That is, as those seeking, sampling, grasping things on the ends of his arms developed, getting into all sorts of situations, his brain had to grow into a pattern that could follow and control their behavior.

Our Nature to Grab

Whether this theory be wholly true or not, it is certainly true that the first thing any of us does, when an interesting or desirable object presents itself within arm's length, is to try to take hold of it.

And that utterly natural human gesture is exactly the thing that makes our lesser neighbors so terribly afraid of us, and leaves us so much alone in the world. To a bird or a squirrel or a frog or a butterfly, any sudden snatching movement means only one thing: something, somebody is trying to catch and eat him, and it behooves him to get away from there by the quickest and shortest route. So you are left with a handful of air, or at most a tail-feather, and your disappointment. And you have made some small scared thing more afraid than ever of that dreadful Ogre, Man.

The first step in winning the closer acquaintanceship of the friends of Hiawatha and St. Francis, then, is to perform this very literal act of self-mortification—you must quite deliberately kill one of your most fundamental instinctive tendencies. The open hand, not the closed one, is what speeds your wooing of the little folk of the forest.

You must not only refrain from trying to grab. You must learn not to make any sudden large movements at all. That again is counter to a very natural human tendency. Like our re-



MAKING FRIENDS

Even a lively small boy can teach himself the quietness necessary to make a brood of young flickers unafraid and friendly.

mote cousins who swing themselves about in the trees, we are creatures of large and sweeping gestures. But to the birds and smaller animals, large and sudden movements are the gestures of an enemy: life must be purchased with flight as soon as anything of that kind begins to happen.

Be Sympathetic

By the time you have learned to keep your hands to yourself, and to refrain from flailing about with your arms and legs, you will have begun to see the real foundation for friendship with animals unafraid. It is just this: you must so far as possible put yourself in their place. So far as your more complex mind will let you, you must think the way they do, and thus be prepared to respond sympathetically to their behavior, their way of acting.

You will have to meet them more than half way. If the bird and the beast are really your brothers, as St. Francis was fond of calling them, they are after all your younger brothers—your very

much younger brothers. You can understand them, at least in part; they can hardly understand you at all. Condescension is quite frankly called for, though there need not be anything snobbish about it. The more comprehending mind must fit itself to the ways of the less, and even be willing to have the little brother take certain outrageous small liberties. You must treat your small neighbors not as if they were grown-up humans, but as if they were the youngest and most irresponsible kind of small children.

Lure With Gifts

After the quietness, the passivity, that lets the natural trustfulness of small creatures develop itself, comes luring with little gifts of food—for the way to an animal's heart, no less than to a man's, lies through its stomach. This innocent bribery must also be conducted quietly and without aggressive movements. Too many of us become impatient when the squirrel does not promptly run up and take the proffered nut from between our fingers. The bestowal of many nuts is demanded as the price of confidence; even a squirrel's friendship is not for sale cheap. The park squirrel that runs up your coat and rummages your pockets at first sight has already received his introduction to human friendliness from other teachers.

Even after you have won the trust of bird or animal by quietness, and completed your conquest by an appeal to its appetite, you must continue the friendship on the creature's own terms. Some animals and birds do not mind being handled, others never submit willingly to being held. You simply have to find out the preferences of the species you are dealing with, and even of the separate individuals of that species.

Friendship between man and animals on a wholesale scale is splendidly demonstrated in our national parks. Hunting is rigidly prohibited the year round; every firearm brought into a national park is sealed by a ranger at the entrance. Hence the national parks animals and birds have never learned the fear of man as a destroyer, and know him only as another creature who comes into their range, and sometimes gives them food.

Even Deer

Thus we have the spectacle of friendly dealings not only between man and small creatures like marmots and jays, but the circle is enlarged enough to take in such giants as deer and black bear. Some of the larger animals, like the elk, are too shy to permit near approach, and some, like the grizzly bear, are natural solitaries who have no close contacts even with others of their own kind. Yet even these less intimate animals are not

frightened at the approach of man.

Animals whose lot is to serve as prey to other animals will lose their fear of these sub-human enemies as well, if for any cause the predator makes truce. The lamb is quite willing to lie down with the lion—provided he is not required to lie down inside. The odd picture appearing on page 189, made by the nature photographer, Lynwood Chace, of a new-hatched chick standing curiously over a sizeable snake not for the moment in an aggressive mood might be duplicated many times over, if one only had a camera handy at the right times.

Mouse Unafraid

An incident of the same kind, but even more striking, occurred some time ago at a scientific station in California. One of the men on the staff, a scientist of considerable dignity and position, was rather proud of his ability to capture rattlesnakes alive, in his off hours. One day he brought in a big rattler, which was naturally in a very vicious mood at being thus caught and thrust into a glass prison. The snake struck venomously at everything that moved, only to hurt his nose on the heavy plate glass. At last, learning that his normal game of offensive defense was getting him no results, the snake curled up in a corner and sulked.

After a few days, his captor thought the snake might be hungry, and dropped a mouse into the cage. Mice are natural prey of rattlers. But this one, like many snakes in captivity, refused to eat.

The mouse, at first frightened, finally calmed down and betook itself to another corner. After a few hours, the scientist took another look at the cage, to see whether his captive had decided after all to take a meal.

He found the rattler coiled up, fast asleep, and on top of him was the mouse, also fast asleep.

Science News Letter, September 22, 1934

In observing children of pre-school age, University of Minnesota psychologists find that children's quarrels at this age last, on the average, only 23 seconds.

A balanced diet for young mosquitoes, of some species at least, need not include the vitamins A, B, C, and D, is the discovery of a scientist who tested the diet requirements of mosquito larvae which have to be raised for certain laboratory experiments.



HARMONY

Young squirrel, young bluejay, old man, in a very literal "concert of friendship."

MEDICINE

Medical Scientists Wage War On Infantile Paralysis

First Objective is Test to Show Susceptibility, Search Next Will Be for Preventive or Curative Serum

INFANTILE paralysis, dreaded enemy of young people, will receive its first major defeat when medical science discovers a way to pick out persons who are liable to contract it. Toward the development of such a susceptibility test research workers are now devoting their best efforts.

The development of a vaccine which will protect children against infantile paralysis will represent a great advance in the control of this disease, but to insure its widest application this test for individual susceptibility will also be required. This is because a comparatively small number of children will contract the disease in its paralytic form, and without a test for susceptibility a great number of non-susceptible children would be injected in order to protect a very small number.

Prominent medical opinion in Washington, D. C., holds that the newspaper publicity which has recently been given to research in this connection is unfortunate in that it promises much to the public long before such a vaccine could be made available even should it later develop that it had any value.

Not a Big Problem

As a public health problem, infantile paralysis does not rank with such diseases as diphtheria, tuberculosis or cancer. Because infantile paralysis often, but not exclusively, attacks little children, it has a peculiar heart-rending

appeal. No other disease of childhood is as much dreaded by the parents of young children. This is due to the very severe crippling which sometimes follows the infection; the fear is out of all proportion to the actual numbers of children affected.

Considered in proportion to the total number of children of the most susceptible age, very few show any recognizable sign of the disease even during epidemics. It can not compare in infectiousness with such diseases as, for example, measles and chicken-pox, to which practically all children are susceptible. The paralytic form of infantile paralysis is probably one of the least prevalent diseases of childhood. Even in epidemics seldom more than three or four in 1,000 children are affected.

In a Score of Places

In a score of American research laboratories attempts are under way to develop means of combatting infantile paralysis. Epidemics, such as the one that is subsiding in California, offer opportunities for clinical and experimental research.

One of the first steps in studying any disease is to find an animal that is susceptible to it. Research on infantile paralysis is made slow and expensive because the only animal, except man, to which the disease can be given is the monkey. And monkeys are expensive animals to use, compared with guinea pigs and rabbits.

The development of vaccines or serums has proceeded along two converging lines: 1. A treatment for minimizing or moderating the course of the disease in its early stages after the child has become ill. 2. A vaccine for making susceptible but as yet healthy persons immune to the disease.

The present striving toward the conquest of infantile paralysis began in 1910, when Drs. Simon Flexner and P. A. Lewis, of the Rockefeller Institute for Medical Research, observed that monkeys which had recovered from the disease resisted a second attack. Sev-

eral scores of investigators here and in Europe carried on from this point, first discovering that what are called antibodies or neutralizing substances are present in the blood of recovered animals and people. These are, in effect, soldiers of the blood, that repulse the attacks of the invisible virus that causes the disease.

It was a logical step to use the blood of a recovered man to attempt to transfer the survivor's immunity to a person exposed or actually in the first stages of the disease. This was done by preparing "convalescent serum" from immune blood and injecting into patients early in the disease. It was later found that the blood of normal adults, particularly in cities, contained as much of the protective substances as the blood of recovered patients, if not even more.

Not Sure

Mixtures of virus and immune serum have been used with considerable success to immunize monkeys but since an occasional animal gets the disease, this vaccine can not be used in humans. Immunity for two or three weeks may be conferred by injecting the so-called convalescent serum alone; this method has been used in recent years in fighting epidemics.

The simplest method of attempting to protect a child who has been exposed to the disease is to give injections of the blood of any adult, usually that of the child's parent, or that of persons who have recovered from the disease. The procedure is very simple; it consists of taking an ounce of blood from the arm vein of the donor and injecting it immediately into the child's muscles. The family physician can do this. Since there is little danger in this procedure, it is recommended by authorities in the case of an epidemic.

As has been the case with other virus diseases, injections of human blood, convalescent or adult, have not been found to be of value when administered after the onset of the disease, both before and after paralysis develops.

The next step toward a vaccine for protection against infantile paralysis consisted of attempts to devitalize the virus sufficiently to make it harmless and yet produce a reaction within the body that would combat the disease. In this the medical investigators had the example of the famous Pasteur treatment for rabies, which utilizes a partially killed virus, and the Fermi or Semple method, which consists of dead virus.

This is probably the type of vaccine

VITALISM and MECHANISM

A DISCUSSION

between

HERBERT V. NEAL

Professor of Zoology, Tufts College

and

JAMES F. PORTER

Being a survey of these opposing theories from the point of view of a scientist and a layman.

50 Cents

SHERMAN M. GOBLE

103 W. Adams St.

Chicago, Ill.

that Dr. Maurice Brodie, of New York University, is using, while Dr. John A. Kolmer, of Temple University, Philadelphia, may be working with a virus which is still alive. Using monkeys, they infect them with the disease. The spinal cords are removed, ground up, and treated with a chemical to completely or partially devitalize the contained virus. Dr. Brodie uses formalin and Dr. Kolmer uses castor oil soap. Dr. W. T. Harrison, of the United States Public Health Service, is known to be working on a similar vaccine, but he has as yet made no report of procedure or results.

As yet the use of such vaccines is far from being a practical procedure. Even though medical men were quite

sure that there would be no danger in treating children with the vaccines, there is still the lack of a simple test for susceptibility to tell which children are already immune and which should be immunized.

Under present conditions it would be necessary to use one and sometimes two monkeys in testing each child: One monkey to tell whether the child's serum will destroy the virus; children whose serum did not possess this property would be immunized and a second monkey used to determine whether the serum had taken on this property. Since monkeys cost \$15 each, it is apparent that such a test could not be used on a large scale.

Science News Letter, September 22, 1934

AGRICULTURE

Back to Land Movement No Solution for Farm Ills

FEWER people on the land, working shorter hours with modern machinery and other scientific aids, to operate bigger farms at a lower cost per bushel of grain or pound of meat produced: this was the somewhat unorthodox picture of real agricultural reform presented before the meeting of the British Association for the Advancement of Science by Prof. J. A. S. Watson of Oxford University, president of the section on agriculture.

The strong movement to send people back to the land, in Prof. Watson's opinion, is based mainly on blind tradition and can find very little rational or economic support. But such ideas die hard, he admitted.

"It is still considered a meritorious thing to employ an agricultural laborer, but there is no particular feeling about the employment of barbers, haberdashers or electricians," he said. "It is somehow more honorable to plough a field than to let it lie in grass. It is a nobler thing to grow wheat (even if nobody wants to eat it) than peaches or strawberries.

Legacy From Past

"These notions are a legacy from the time when the world was hungry of necessity, and when people lived healthily in the country but died quickly in the towns. We must realize that these conditions have ceased to be. There is a superabundant organization for food

production and there is no difficulty about breeding up a good and healthy human stock in the modern city. It seems to me that there is no argument for keeping unnecessary workers in agriculture or for driving people back to the land."

Neither had Prof. Watson much respect for the various schemes on which nations are working, each to make itself agriculturally self-sufficient, and at the same time to boost its exports of farm products.

He flicked at these schemes a whip-lash of ironic comment:

"Some of these measures, indeed, are not so much rational means to assist agriculture as the weapons of economic warfare, in which apparently one of the

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CHROMIUM AND THE STAINLESS STEELS

an address by

Dr. F. M. Becket

President of the Union Carbide and Carbon Research Laboratories, Inc.

Wednesday, Sept. 26, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

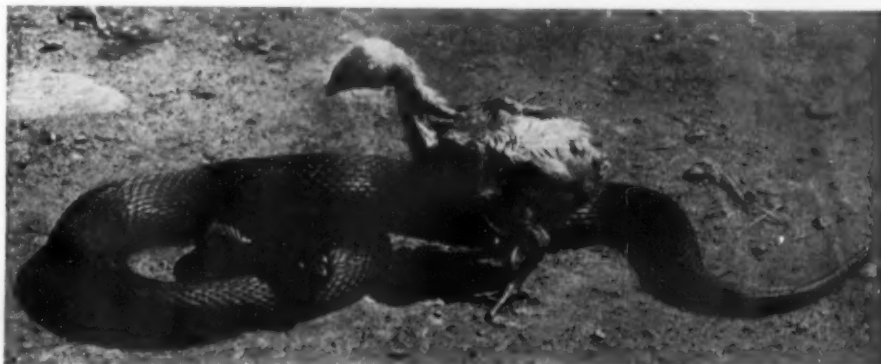
objects of strategy is to force upon the enemy more food than he can eat."

The complex of causes of the agricultural depression, as seen by Prof. Watson, has a striking resemblance to the same picture as viewed by the American Secretary of Agriculture, Henry Wallace, and the economists on his corps of assistants. Factors in the farmer's losing fight have included the continual opening up of rich new lands where grain could be produced at ever-decreasing costs, improved heavy-yielding crop plants and the overcoming of a lessening world demand in the face of this increasing world supply, a general slump in the whole economic set-up, currency value fluctuations resulting in a mounting burden of unpayable debt.

The principal weapon available to a planned agriculture, Dr. Watson felt, is greater efficiency per working unit—a larger output from fewer but better equipped and less overworked farmers.

Science News Letter, September 22, 1934

An albino elk, very rare, was seen this year in Glacier National Park.



FORGOTTEN ENMITIES

Even traditional enemies do not inspire fear, if they refrain from aggressive acts, as this water-snake did, at least for the time being. (See page 186)

PSYCHOLOGY

Electric Signals To Brain Aid Understanding of Mind

Mongrel Dog With Coil Connected to Brain Becomes Living Robot When Current Is Induced; Feels no Pain

XENIA, just a plain American mixed breed dog, is teaching the psychologists new secrets of the working of mind and body.

A happy, healthy animal, she is unusual because for the sake of science there has been arranged an induced current connection between an electrical transmitting coil and an electric coil buried beneath the skin of her head and attached directly to her brain.

With great friendliness toward her sponsor, Dr. Roger B. Loucks of Johns Hopkins' Phipps Psychiatric Clinic, Baltimore, the dog Xenia acted as subject in experiments before the meeting of the American Psychological Association, where she was one of the distinguished guests.

From the experiments with Xenia (pronounce her Russian name as though it were spelled Zenia) psychologists and psychiatrists hope to learn more of the special functions of various areas of the brain. They hope to discover just how learning takes place and how the behavior of man and other animals can be modified.

Xenia's Russian name is appropriate because the experiment in which she is assisting so vitally is a continuation of research associated with the name of the great Russian, Pavlov. Dr. Loucks followed the Russian tradition of naming his subjects alphabetically. Xenia is the twenty-fourth.

The coil buried in Xenia's head can pick up electromagnetic energy from another coil outside her head in somewhat the way that a radio receiver picks up the energy of a broadcasting station, Dr. Loucks said. Thus the experimenter can reach the brain of the animal directly without any pain or annoyance to the animal. The brain, having no sense organs, does not feel the electric current at all, so that the dog during experiments does not even flicker an eye.

Xenia is friendly and as much interested in going through the experiments as is her scientist friend and master.

When she goes into the room where the apparatus is set up she strains at her leash to get to her proper place, wagging her tail, pricking up her ears and watching the experimenter with sparkling eyes. When the experimenter pushes a button, thus sending the signal to the proper motor area of Xenia's brain, her movement of her paw results so inevitably and mechanically that the dog may be considered a living robot in this respect.

Dr. Loucks has studied ten dogs by this same method, making the connections to various parts of the brain.

When the signals go to the motor area of the brain as they do in Xenia,

the animal can not be taught to respond to a buzzer alone, which previously was sounded coincidentally with the application of the current, even after nearly a thousand trials. The animal fails to make the connection between the sound of the buzzer heard through the ears and the current going directly to the brain.

When the current goes directly to the sensory area of the brain as it does in other of Dr. Loucks' dogs, however, such a relationship between buzzer and current is readily made. The dog will get so that he lifts his paw at the sound of the buzzer without any current just as you might find your mouth watering as you catch the odor of frying bacon or the sound of a dinner bell, even though you have no food in your mouth.

Applications of this method may aid in the diagnosis of ailments of the brain from the special behavior of the patients. Such indirect methods are necessary because of the difficulty of discovering by X-ray or other such means the exact location of injuries to the human brain.

Thus Xenia and her companions, al-



XENIA

Despite her distinguished Russian name, she is just an ordinary healthy, happy American dog of unknown ancestry who is aiding scientists to gain new information about the mind. The small coil shown lying on Xenia's head induces a current in another coil buried beneath the skin. It carries a signal direct to the animal's brain in much the same manner that a radio receiver inside a building picks up the energy of a broadcasting station. The signal goes directly to the motor area of Xenia's brain. In response, she raises her right hind paw so inevitably and automatically that she is a living robot in this respect. Yet Xenia does not so much as flicker an eyelash. The brain, having no sense organs, does not feel the current at all.

though enduring no sacrifice themselves, are contributing notably to the aid of science and to the sufferers from brain injuries.

Learning can take place, to a limited extent at least, when the brain cortex is completely missing. Cases of dogs who had lost their brain cortex through injury to the brain and yet could be "conditioned" or taught to modify their behavior, were reported to the same meeting by Dr. Elmer Culler, of the University of Illinois.

When a bell is rung or a light is flashed at the same time that a healthy animal is given an electric shock, he will soon learn to pull back his paw as soon as the bell or light signal is given and thus avoid the shock. The animal who has lost the brain cortex can not learn to avoid the shock, but he does learn to show general symptoms of annoyance at the signal alone. This shows that he does make a connection between the signal and the shock.

Science News Letter, September 22, 1934

PSYCHOLOGY

Pleasantness of Words Depends On Meaning

YOUR EAR is pleased by such musical words as coral, serene, and swan, and offended by others such as waddle, and squawk, because of your past associations with these words and not because of their sounds. This finding, at variance with the opinion commonly held by poets and orators, was reported to the American Psychological Association by Dr. Edward L. Thorndike, of Teachers College, Columbia University.

Persons who rate words for the unpleasantness or pleasantness of sound alone, regardless of meaning, are nevertheless influenced by the meaning the words have for them, Dr. Thorndike declared. Nonsense words, made up to test the pleasantness of certain sounds, are likely to be rated according to their resemblance to meaningful words.

The commonly assumed superiority of vowels and liquids, and the inferiority of gutturals and aspirates have probably been overestimated, Dr. Thorndike said. Thus, in the artificial words, "malo" showed no great superiority, from the subject's judgments, over "masho," "macho," and "mago." The sound of a as in father appeared to be little more pleasant than a as in fat.

Science News Letter, September 22, 1934



Unreturning Wilderness

EVEN the undisturbed bits of wilderness we have left are not really the same as they were before the white man came.

Many places in the East still have their fragments of virgin timber, that have never known ax or fire. Many in the West can similarly boast of patches of virgin prairie, that have never been plowed or grazed over by domestic cattle. Such a relic of the aboriginal wilderness is usually (and quite justifiably) the pride and boast of the community that has preserved it.

Yet they are never quite the same as they were in pre-civilized days, any more than a piece of cloth from your great-grandmother's wedding gown is the original gown itself. They may harbor the same trees, the same wildflowers, that have been part of their makeup since earliest times, but these are only a part of the pattern, just as the

embroidery on your woven heirloom is only a part of its pattern. They have lost the continuity with other areas of their own kind, and are now at best just patches of an old and beautiful fabric set, without matching, into the land's new garment of cultivated fields, pastures and orchards.

And even their pattern is inevitably disturbed. Ask concerning a boasted bit of unplowed prairie: almost every time you will be told, "Oh, yes, we cut it for hay every year." And the custodians of the bit of virgin timber carefully remove dead trees blown down by the wind.

But cutting wild grassland for hay always changes it. At haying time certain of the plants are bound to be in bloom, or in early and immature seed. The offspring that they might have if left undisturbed are lost or diminished, and to that extent the makeup of the vegetation is artificially altered.

Further, in neither forest nor prairie of the present time is anything like the old animal life to be found. Bison and pronghorn antelope are far away, elk and deer likewise. They were as much part of the life-complex of the natural woods and prairies as were the plants themselves. And under present-day conditions not much can be done to bring them back.

All this is not an accusation of futility leveled against the keeping of little wilderness areas. Quite the contrary; we should keep what fragments of the once seamless robe we are able to preserve. But we should not nurse sentimentally mistaken notions about their present nature.

Science News Letter, September 22, 1934

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Psychiatry

MENTAL DEFECT—Lionel S. Penrose—*Farrar and Rhinehart*, 205 p., \$2.50. Many popular books have been written on mental disease. This one takes up another problem, mental deficiency. The important distinction between disease and defects of the mind, generally not too well understood according to the author, is carefully explained. Various types of mental deficiency are described, what is known of their causes told and finally the methods of treatment and their results are discussed. The author gives rather convincing arguments against sterilization of mental defectives.

Science News Letter, September 22, 1934

Physiology

INSTRUCTION IN THE EFFECTS OF ALCOHOL AND TOBACCO—James Frederick Rogers, M.D.—*Gov. Print. Off.*, 7 p., \$.05. A timely leaflet with a bibliography of books on alcohol and tobacco.

Science News Letter, September 22, 1934

Botany

ECONOMIC PLANTS—E. E. Stanford—*Appleton-Century*. Price listed incorrectly as \$4.50. Correct price, \$5.00.

Science News Letter, September 22, 1934

Ethnology

A NEW ORIGINAL VERSION OF BOSCAN'S HISTORICAL ACCOUNT OF THE SAN JUAN CAPISTRANO INDIANS OF SOUTHERN CALIFORNIA—J. P. Harrington—*Smithsonian Institution*. Price listed incorrectly as .05. Correct price, .25.

Science News Letter, September 22, 1934

Medicine

MEDICINE MAN IN CHINA—A. Gervais—*Stokes*, 336 p., \$2.75. Rushing narrative translated from the French by Vincent Sheean, recounting the experiences and observations of a practicing surgeon and medical school professor far up the Yangtze in the interior of China.

Science News Letter, September 22, 1934

Statistics

ELEMENTARY STATISTICS—James G. Smith—*Holt*, 517 p., \$3.50. A text by the associate professor of economics at Princeton University. It will be a source of enlightenment to many who are forced to use statistics without adequate formal preparation. The six parts

are titled: Quantitative Expression of Facts, The Study of Static Variability, The Study of Dynamic Variability, Foundations of Scientific Method, The Study of Bivariates—Static or Dynamic Variability and The Evolution of Scientific Method.

Science News Letter, September 22, 1934

Public Health

PAPERS OF CHARLES V. CHAPIN, M.D.—*The Commonwealth Fund*, 244 p., \$1.50. For nearly half a century Dr. Chapin was superintendent of health of the City of Providence and a leader in the development of the American public health movement. As a fitting tribute there have been brought together in this volume sixteen of the many papers that Dr. Chapin has written.

Science News Letter, September 22, 1934

Biography—Embryology

FRANKLIN PAINE MALL, THE STORY OF A MIND—Florence Rena Sabin—*Johns Hopkins Press*, 342 p., \$2.75.—The biography of one of the group of eminent medical scientists which has centered in the Johns Hopkins University and played such a large part in the development of American medicine. The author was his student and co-worker for twenty years, now herself a leader in science and one of the few feminine members of the National Academy of Sciences.

Science News Letter, September 22, 1934

History of Agriculture

ESSAYS UPON FIELD HUSBANDRY IN NEW ENGLAND, AND OTHER PAPERS, 1748-1762—Jared Eliot; Harry J. Carman and Rexford G. Tugwell, editors—*Columbia University*, 261 p., \$3.50. Minister, physician and farmer, Jared Eliot, eighteenth-century pioneer of scientific agriculture has deserved well of his countrymen; and his present editors, as well as Prof. Rodney True of the University of Pennsylvania who contributed the biographical sketch, merit also their meed of applause for having made widely available this excellent reprinting of his writings, hitherto accessible only in a few large libraries.

Science News Letter, September 22, 1934

Ichthyology

TROPICAL FISH—Lucile Quarry Mann—*Leisure League of America*, 99 p., 25c. Goldfish bowls figure now only in picturesque political phraseology; if you want to be "in the swim" you cultivate tropicals. There are bigger and more detailed treatises on this fascinating hobby, but for the initial "nibble" at least this little book will serve excellently: it has a surprising amount of information packed into it, and a dozen good black-and-white illustrations.

Science News Letter, September 22, 1934

Mineralogy

ROCK WOOL FROM ILLINOIS MINERAL RESOURCES—J. E. Lamar, H. B. Willman, C. F. Fryling and W. H. Voskuil—*Illinois Geological Survey, bull.* 61, 262 p., \$1.

Science News Letter, September 22, 1934

Diet

YOUR MEALS AND YOUR MONEY—Gove Hambidge—*McGraw-Hill*, 190 p., \$1.50. This is a sound and practical book on national and personal planning to satisfy appetites. The author has utilized the latest information of the U. S. Department of Agriculture and like the well-balanced meals which are described, the text is dished up with a literary effectiveness.

Science News Letter, September 22, 1934

Zoology

LEÇONS DE ZOOLOGIE ET BIOLOGIE GÉNÉRALE—Georges Bohn—*Hermann et Cie., Paris*, Part III, LES INVERTEBRÉS, 102 p., 15 francs; Part V, ASSOCIATIONS FONCTIONNELLES, 89 p., 15 francs.

Science News Letter, September 22, 1934

Physiology

EXPOSÉS DE PHYSIOLOGIE—*Hermann et Cie., Paris*, Part II, BIOCHIMIE DE LA CONTRACTION MUSCULAIRE—T. Cahn and J. Houget—41 p., 12 francs; Part III, ESSAI DE CLASSIFICATION DES SUBSTANCES SYMPATHICOMIMÉTIQUES—Z. M. Bacq—24 p., 8 francs; Part IV, L'ANALYSE MITOGÉNÉTIQUE SPÉCIALE—A. and L. Gurwitsch—39 p., 12 francs.

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